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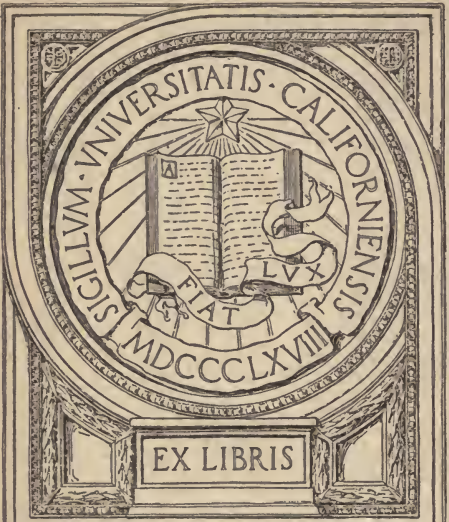

THE AMERICAN RED CROSS

COMMISSION TO GREECE

THE TYPHUS EPIDEMIC

IN

EASTERN MACEDONIA

BY MAJOR SAMUEL J. WALKER, M. D.,

DEPUTY COMMISSIONER

HEAD OF THE DEPARTMENT OF MEDICINE AND SANITATION

Athens
June 1, 1919

ATHENS

PRINTED BY P. D. SAKELLARIOS

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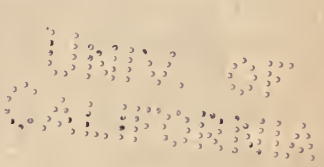

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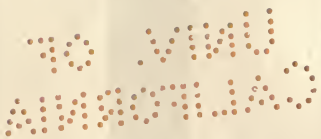

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Athens, June 1, 1919.

From: *Major Samuel J. Walker, Deputy Commissioner, Head of the Department of Medicine and Sanitation.*

To: *Lieutenant-Colonel Edward Capps, Commissioner.*

Subject: *Typhus Fever in Oriental Macedonia and The American Red Cross.*

INTRODUCTION

Burdened with all the misery that human flesh is heir to, the Greek refugees from Bulgaria began to pour into Oriental Macedonia shortly after the declaration of the armistice, and the stream continued through the fall and winter of 1918 and through January 1919, since which time they have continued to come, but in gradually diminishing numbers.

They came by thousands, cold, hungry, thirsty, filthy and vermin-infested from a country lousy with typhus fever; they suffered such frightful privations that many died by the wayside.

Human wretchedness in all its protean varieties affecting large groups of people blazes the way for the spread of disease. No wonder, therefore, that typhus fever appeared in sporadic form in Kavalla, Drama, Serres, Demir Hissar and a few other smaller centers through January, 1918, and continued to smoulder in these centers through January, 1919; the wonder is that the disease did not assume epidemic form much earlier than it did. All the

conditions necessary for the rapid spread of the disease were present; potentially there was an epidemic of typhus fever in Oriental Macedonia long before it appeared.

It is interesting to note here that on January 17, 1919, your Medical Director held a long conversation with a prominent Greek Army official directly concerned with Macedonian affairs. This conversation was solicited by your Director solely to discuss the typhus situation in Macedonia, which in his opinion showed distinct mutterings of impending trouble. He was reassured, however, by this official, who stated that all necessary measures were being taken by the Greek sanitary officers, and that in their opinion there was no danger of an epidemic. Later investigations revealed, however, that the «necessary measures» had not really been taken, and at the time referred to the sanitary authorities had been by no means alive to the situation.

The time to control an epidemic is in the pre-epidemic stage. This is especially true of typhus fever, because, given proper organization and equipment, typhus fever, even in epidemic form, can easily and surely be controlled, and naturally in the pre-epidemic stage more easily and more quickly stamped out.

On January 25 and 26, 1919, kindling was added to the smouldering typhus situation in Oriental Macedonia by the arrival at Kavalla of three Greek ships from Varna bearing 2150 Greek refugees, and among them twenty-one cases of typhus fever. The local authorities seem unfortunately not to have appreciated the conditions thus confronting them and missed the opportunity thrust upon them of stamping out the disease.

Not until February 25th did the Greek authorities awake to the seriousness of the situation, when they reorganized and greatly strengthened the force of inspectors, with the result that on that date and the four following

days 252 cases of typhus fever were officially uncovered among the refugees who had landed at Kavalla on January 25 and 26.

This alarming news was wired to the headquarters in Athens of the American Red Cross Comission to Greece by Major Horace S. Oakley, at that time our representative in Macedonia. The Commission immediately went into conference. The situation which confronted us was this: If the disease could immediately be brought under control, so that the lives of our workers, who to the number of about thirty-five were administering relief to the war-sufferers of that region, would not be increasingly and unnecessarily exposed, our workers would be allowed to remain at their posts; otherwise we should be obliged to withdraw our forces from Eastern Macedonia. We naturally proposed the former alternative, which, however, presupposed that the Greek authorities would welcome our participation in the anti-typhus fight and would accord our Medical Department such a degree of support and authority as would reasonably insure the safety of our workers and the success of the enterprise as a whole. Several conversations were then held with Mr. Athanasaki, Under-Secretary of State for War, in charge of Hygiene and Sanitation, in which we offered the Greek Government our fullest cooperation in medical personnel and supplies to help combat the typhus fever epidemic in Kavalla and Oriental Macedonia.

Mr Athanasaki accepted the offer in the spirit in which it was made and did everything in his power to prepare and smooth the way for the participation of the American Red Cross in the anti-typhus campaign. To meet the emergency an American Red Cross medical unit was organized consisting of Major Samuel J. Walker and four other physicians, namely, Captain Paul D. White and Lieutenants D. S. Clark, C. A. L. Binger, and J. S. Hodgson. With

them was associated Mr. B. H. Hill, Director of the American School in Athens, who volunteered to accompany the unit and to act as its interpreter and diplomat. The first contingent of this unit, consisting of Major Walker and Mr. Hill, was rushed to Kavalla by special boat, the Submarine Chaser No. 248 U. S. N., leaving Piraeus March 2nd and arriving at Kavalla March 4th.

Fig. 1.—Mayer Typhus Hospital, Kavalla.

KAVALLA

Preliminary Observations and Investigations.

Kavalla has a population of 18000 (correct figures from a recent census) and is easily the most important city of Oriental Macedonia. The principal industry is the sorting, curing and shipping of the finest grades of cigarette tobacco; the city is full of huge tobacco warehouses largely operated by American interests.

We arrived in Kavalla March 4th, beset by many rumors as to the actual number of typhus cases in the city. Mr. Athanasaki, on February 27th, had official telegraphic information that the total number of cases was eighty; another well-informed source stated the number to be six hundred; still another rumor placed the total number of cases as something over one thousand. As a matter of fact there were, on March 6th, two hundred and seventy-six cases of typhus fever in the Kavalla hospitals; of this number ten were soldiers, eight nurses, three doctors and twenty civilians, thus showing that the disease had assumed epidemic form outside the refugee ranks.

After several satisfactory conversations with General Negroponte, ranking army officer of the Kavalla district, and his chief medical officer Colonel Kourtakis, we began our preliminary observations and investigations.

Under the guidance of Colonel Kourtakis the following facts were uncovered:—

1. The refugees arriving at Kavalla January 25 and 26, 2150 in number (every one of whom had been directly or indirectly exposed to typhus fever), had been huddled together in eight large tobacco warehouses (hereinafter to be called «barracks») under lax quarantine regulations and lax medical inspections, as was plainly evidenced by the explosive outburst of 252 cases of typhus in five days, when the figures for the entire week previous to these momentous five days showed only eight cases. It is simply impossible for such discrepancies in figures to occur in any epidemic under efficient daily medical inspections. In other words, most of those 252 cases were present many days in the refugee barracks before they were properly diagnosed and isolated.

Under the circumstances it is difficult to understand how these poor refugees, after such thorough exposure to typhus fever, escaped as well as they did. The most rea-

sonable explanation seems to be that probably many of them had already had typhus fever and were therefore typhus-immune.

2. Some days after the arrival of these 2150 refugees at Kavalla the authorities began systematically to delouse them at the rate of about 200 per day; after being deloused they were placed in so-called «clean» barracks, where they were held in quarantine for 21 days; they

Fig. 2.— Refugees leaving Kavalla, after having been deloused and quarantined.

were then given clean-bill-of-health certificates by the civil sanitary authorities, and sent to Drama, Serres and Demir Hissar with orders to report to the sanitary authorities of these cities. All of this sounds like a perfectly good arrangement and would have been so had the Kavalla authorities done their work efficiently, but unfortunately they failed in two most vital particulars. It was the same old story: both the quarantine and the medical inspection of the refugees in the clean barracks were inefficient, the result being that many of these refugees

from Kavalla carried typhus fever, along with their clean-bill-of-health certificates, into Drama, Serres and Demir Hissar. In Serres it was no uncommon occurrence for the refugees, already victims of typhus fever, to present themselves to the sanitary authorities at the same time clutching Kavalla clean-bill-of-health certificates in their hands—a situation almost amusing if it were not so sad and tragic.

This indiscriminate sending forth of hundreds of refugees from Kavalla without previous proper medical inspec-

Fig. 3.—Typhus Ward in Mayer Hospital, Kavalla.

tion was decidedly, in the opinion of your Medical Director, the most criticisable single act of the Greek sanitary authorities in their management of the typhus situation in Oriental Macedonia. It undoubtedly had much to do with the putting of typhus fever on an epidemic basis in the centers outside of Kavalla.

3. The city of Kavalla had been divided into seven sanitary sections, the medical responsibility for these sections being about equally divided between the military authorities on the one hand and the civil authorities on the

other hand. A sanitary committee, consisting of one physician, one civilian and one police inspector, was appointed for each section and held responsible for the daily medical inspection of the inhabitants of that section, in order that no case of typhus fever or typhus suspect might remain undiagnosed or hidden.

The usual regulations for reporting and after-handling of all cases were used, proved typhus cases, typhus suspects, and those exposed to typhus being quarantined or isolated as their status demanded.

4. The typhus equipment in Kavalla was good and sufficient, consisting of —

a. The Mayer Hospital (until February 25, 1919, the main military hospital for the Kavalla district) for refugee and civilian typhus cases; accomodations for 400 patients.

b. The Military Hospital (until February 25, 1919, the Officers' Hospital for the Kavalla District) for officer and soldier typhus cases; accomodations for 40 patients.

c. The Kolakitha Hospital (just opened) for well-to-do civilian typhus cases; accomodations for 25 patients. All the above hospitals were equipped with separate delousing plants for the patients and their clothes.

d. One large house for quarantining families of typhus patients; practically impossible to operate efficiently; closed early in March.

e. One military delousing plant, an old Turkish bath, well arranged and capable of delousing about 300 persons and their clothing daily.

f. One civil delousing plant, an old Turkish bath, also well arranged and capable of delousing about 400 persons and their clothing each day. The Serbian barrel system was used in all the delousing plants in Kavalla for the disinfecting of clothing.

g. One so-called «clean» barracks for quartering the

deloused refugees, sufficient for the very indifferent housing of about 1200 refugees.

5. Colonel Kourtakis informed us that the medical control and inspection of the refugees in the barracks was vested in the civil authorities until February 25, on which

Fig. 4.—Military Typhus Hospital, Kavalla.

date the military sanitary authorities took over the medical control of the refugees; and that the military medical inspectors uncovered the 252 cases of typhus fever found in the barracks on February 25 and the four following days.

These preliminary observations and investigations brought to light two most important and outstanding facts;

first, that there had been in the Greek anti-typhus organization a division of authority and responsibility — a situation intolerable in the management of any epidemic and always inviting failure; second, that as a consequence of this fundamental weakness in their organization the sanitary authorities were almost flagrantly inefficient down to the time of the explosive outbreak in February, this inefficiency continuing, but to a very much lesser degree for some time thereafter.

Plans for the participation of the American Red Cross in the anti-typhus fight.

The American Red Cross medical unit plainly had important functions to perform; therefore on Sunday, March 9, armed with the facts as above outlined, we had a conference with General Negroponte and his chief medical officer, Colonel Kourtakis. At this conference it was arranged that henceforth all the authority and responsibility for the management of the epidemic should rest in one person, Colonel Kourtakis, which arrangement formed at least the nucleus, and the nucleus fundamentally necessary, of an efficient organization. Next, a plan for the participation of the American Red Cross in the Kavalla anti-typhus campaign was formulated. The plan adopted, briefly outlined, provided for the following program:

1. A daily conference between the Chief of the Greek anti-typhus organization and the American Red Cross medical officers.

2. Daily inspections and investigations of the typhus field in Kavalla by the American Red Cross medical officers, these inspections and investigations to have the fullest cooperation of the Greek sanitary officers.

3. The results of these inspections and investigations in

the form of suggestions and recommendations to be presented each day at the conference.

4. All suggestions and recommendations made by the American Red Cross medical unit to receive the utmost consideration from the Greek sanitary authorities, and to be carried out as soon as possible.

5. The program, as outlined, to go into effect immediately.

A conference was held on the same day and was attended by the entire American Red Cross medical unit,

Fig. 5.—Rich Man's Typhus Hospital, Kavalla.

the second contingent having arrived in Kavalla by this time; present at this conference were Major Walker, Mr. Hill, Captain White, Lieutenants Binger, Clark and Hodgson, also Major Roger Perkins of the Balkan Commission. At this conference the plan above outlined was presented and agreed upon as a good working basis for the participation of the American Red Cross in the anti-typhus campaign in Kavalla.

The above embodies the data obtained and the work accomplished by the first contingent of the American Red

Cross medical unit, and prepared the way for our active cooperation.

Active work.

Exactly according to program, we began our work the next day, March 10; it took the form of independent inspections of the delousing plants, and the methods used therein, by Lieutenants Binger and Hodgson, and observations of the medical inspections in the different city sections by Captain White and Lieutenant Clark.

After two days of such inspections and obervations sufficient data were collected to justify the following conclusions:

The delousing plants: That the apparatus was adequate, and that the plants on the whole were working fairly well; that, however, numerous errors of technique prevailed—errors which materially vitiated the final results of the disinfecting process. Therefore we presented to Colonel Kourtakis definite recommendations, the adoption of which we believed would distinctly improve the disinfecting technique. Our recommendations were well received and we were immediately given the authority necessary to carry out our recommendations.

The medical inspections: That the Greek medical inspection of the city sections was well organized and was of much value so far as it went; it was not adequate because some of the sections were so large that two or even three days were required for the doctors to cover them. Now these daily inspections of all the houses in each section were extremely important, in our opinion, and necessary to bring about the best results in the anti-typhus campaign. We therefore recommended to Colonel Kourtakis that the number of sections, and necessarily also the number of medical inspectors, be increased from seven to twelve, and that Kavalla be redistricted accord-

ingly, the American Red Cross agreeing to take over four of the new sections. This recommendation was enthusiastically received and immediately orders were given to carry out the recommendations.

Colonel Kanavatsoglou, Surgeon-General of the Greek Army and the medical head of all typhus work in Macedonia, arrived in Kavalla March 11, bringing with him Lieutenant Moutoussis, chief epidemiologist of the Greek Army. Colonel Kanavatsoglou, an unusually able and ef-

Fig. 6.—Waiting to be Deloused, Kavalla.

ficient leader, made careful inspections of the whole typhus situation in the city and subsequently very materially strengthened the Kavalla typhus organization.

With the changes which had been made in the delousing plants working smoothly, with the increased number of city sections in operation, and with the stimulus given to the whole organization by the presence of Colonel Kanavatsoglou, the anti-typhus campaign in Kavalla was on in earnest.

The organization at this time was made up of twenty-

three physicians, including our own unit, all devoting their entire time to typhus work.

On March 17 Lieutenant Moutoussis, the epidemiologist, was placed in command by Colonel Kanavatsoglou of all typhus work in Kavalla, as Colonel Kourtakis was leaving for duty in Russia. Lieutenant Moutoussis proved to be an able and efficient commander, and still further systematized the organization.

Fig. 7.— Delousing Plant (Old Turkish Bath), Kavalla.

Daily evening conferences were held, attended by all the medical typhus workers. At each conference written and oral reports were submitted, which formed the basis for the Kavalla typhus fever statistics. These statistics showed for each day:

1. The number of new typhus cases found;
2. The number of typhus suspects found;
3. The number and location of quarantined houses;
4. The number of persons deloused;
5. The total number of typhus cases in hospital, classified as to whether civilian, refugee, soldier or officer;

6. The number of deaths.

In addition the conference served to bring out suggestions and led to an exchange of views, thus stimulating the work of every one.

Another factor which contributed materially to the situation was the great good-feeling always existing be-

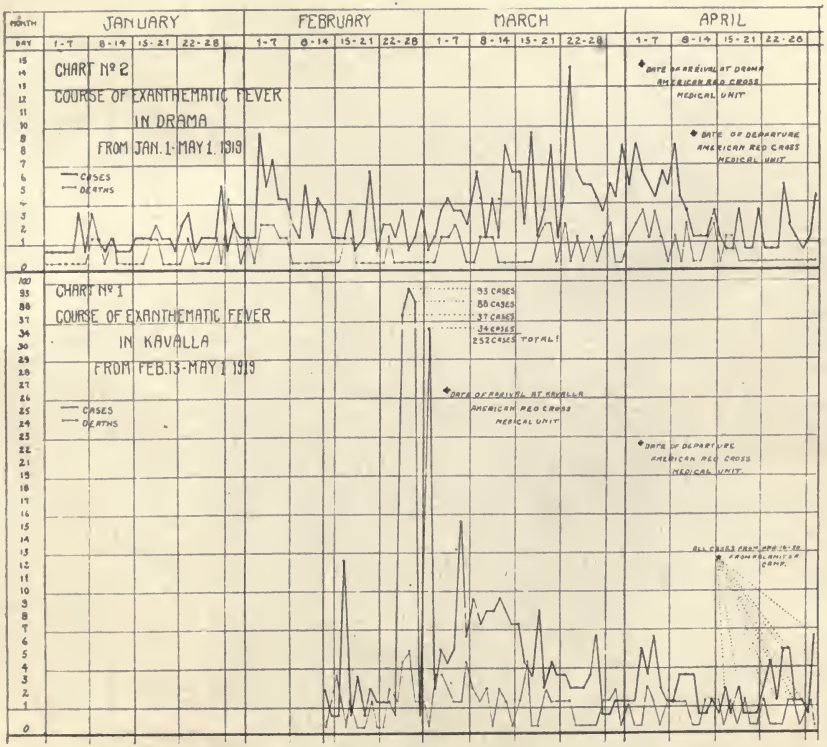
Fig. 8.— Group of Typhus Doctors, Kavalla.

tween our medical officers and the Greek medical officers. We admired the Greeks and their work and the Greeks reciprocated, plainly showing their appreciation of our work and help.

Results.

Good results just had to follow such radical improvements, and they immediately became evident, as reference to the graphic chart* plainly indicates.

* Chart No 1, p. 18. Note the explosive outburst of cases from February 25 to March 1 inclusive; also that all cases charted from April 16 to 30 inclusive came from Kalamitza Camp; i. e., no new cases of typhus fever were found in Kavalla during this period.



CHARTS No. 1 and No. 2.

Briefly summarized, the number of new typhus cases uncovered in Kavalla, from February 19 to April 1 inclusive, was 398; this period of six weeks includes the statistics of the two weeks previous to our arrival and the four weeks of our active work in Kavalla. Divided into weeks the figures are as follows:

Feb.	19	to	Feb.	25	. . .	135
Feb.	26	to	March	4	. . .	139
March	5	to	March	11	. . .	52
March	12	to	March	18	. . .	46
March	19	to	March	25	. . .	20
March	26	to	April	1	. . .	14

The above figures speak for themselves and show conclusively the almost brilliant results obtainable given good organization and adequate equipment. Such results, brought about in such a short time, were a source of great satisfaction and pride to all concerned.

This marked decrease in the Kavalla epidemic, and the excellence of the Greek organization, made it seem no longer necessary for the American Red Cross to continue its full cooperation in Kavalla, especially as typhus conditions in Drama and Serres were distinctly worse than in Kavalla.

Therefore on April 2nd it was decided to send Captain White and Lieutenant Hodgson to Drama to study the typhus situation in that city; Lieutenant Binger was to remain in Kavalla to carry on, at the earnest request of Lieutenant Moutoussis. Lieutenant Clark left Kavalla at this time to return to America.

New Danger for Kavalla.

Before passing on to Drama, however, mention must be made of what seemed at first blush like a startling situation.

On April 8 a shipload of refugees arrived unannounced in Kavalla harbor. Rumors had reached Kavalla that more refugees were coming, but nothing definite was known as to their numbers or time of arrival. The ship contained 700 Greek refugees from Constanza and Varna, among them 5 certain cases of typhus fever and 31 suspects, all of whom were removed to the typhus hospital in Kavalla. The rest of the exposed refugees were kept on board the

Fig. 9.—Serbian Disinfecting Barrels, in full operation, Kavalla.

ship in quarantine and not removed until complete provision had been made for their isolation and care.

The situation was the exact counterpart of the tragic landing of the 2150 refugees at Kavalla on January 25, fraught with such disastrous results already so feelingly referred to.

The way these 700 fresh refugees were handled, however, brilliantly illustrates what a really good typhus organization can do in an emergency. The news that more refugees were coming, although absolutely indefinite as to number and time of arrival, was nevertheless quite suf-

ficient to bring about active preparation for their reception, and consequently, when they did arrive, unannounced, the typhus organization was ready for them.

An excellent site for a quarantine camp had been found and equipped on a point of land called Kalamitza, just west of Kavalla. The equipment of this camp was splendidly good and complete, consisting of sufficient small tents to accomodate all the refugees in groups of not more than 5 or 6 in each tent; several large hospital tents sufficient

Fig. 10.—Kalamitza Refugee Quarantine Camp, Kavalla.

to care for 60 patients with diseases other than typhus; an excellent emergency delousing plant (sufficient to delouse 300 persons and their clothes daily), consisting of well arranged shower-baths and a series of eight Serbian barrels, all new equipment put into an old house already on the grounds; also numerous tents for attendants and a fine kitchen kept scrupulously clean. The camp was strictly policed, and all danger of spreading typhus fever in Kavalla from this camp practically eliminated.

The first lot of refugees were taken from their quar-

antined ship to this quarantine camp on April 12, since which time, to May 1, 33 cases of typhus have appeared in the camp; but during this same period, April 12 to May 1, not a single new case of typhus fever has been found in Kavalla. Moreover, all the refugees in this camp have been vaccinated against typhoid and paratyphoid, the American Red Cross donating the vaccine for the purpose, also against small pox, the Greek Government furnishing the vaccine. It was an ideal camp, ideally located and

Fig. 11.—Another view, Kalamitza Camp.

extremely well managed, and furnishing a beautiful example of what a good, brainy organization can do.

In the opinion of your Medical Director, had the 2150 refugees of January 25 and 26 been handled in anything like the above manner, this report would never have been written.

As already stated, the typhus situation in Kavalla had improved so markedly by April 2nd that on that day it was decided partially to abandon Kavalla and proceed to Drama.

DRAMA

Drama is the capital of Oriental Macedonia and has a population of not more than 24000, about one third of whom are Turks.

On March 29 your Medical Director had a conference with Mr. Gotsis, the Governor-General of Oriental Mace-

Fig. 12.—Typhus Sentinel Post, Kavalla-Drama Road.

donia and Lieutenant Kyriazides, an able and experienced epidemiologist and the chief of the typhus campaign in Drama. At this conference the whole typhus situation in Oriental Macedonia was discussed and arrangements made for the co-operation of the American Red Cross in the typhus campaign in Drama along lines similar to those of the work in Kavalla. On April 3 Captain White and Lieutenant Hodgson arrived in Drama to begin their investigations in that city.

The American Red Cross work in Drama opened under

the most favorable auspices. Several conferences were held with Colonel Kanavatsoglou, who fortunately happened to be in Drama at that time, Lieutenant Kyriazides and Lieutenant Moutoussis; under the guidance of the above-named Greek medical officers an inspection of the Drama typhus equipment was made. Later a special study of the delousing stations was made and recommendations offered for necessary improvements in technique; also thorough inspections of several of the Drama typhus districts were made to study the routine and methods used in the daily district inspections. Our officers also attended the daily evening conferences of the Drama anti-typhus organization.

The result of these investigations and observations made obvious these facts :

1. That the typhus epidemic in Drama was not severe, there being few cases among the natives at any time, the vast majority of cases being among the refugees with a moderate number among the soldiers.

2. That the typhus organization at Drama was good, though not so good as the Kavalla organization, but that it could quickly and easily be made so.

These investigations also unearthed the very interesting fact that there had been a severe typhus fever epidemic in Drama during the Bulgarian occupation in the winter of 1917-18. The epidemic began early in December, 1917, and lasted until June, 1918; there were about 5000 cases in all with 2000 deaths. For a community of less than 10000 people this was an excessive morbidity and also an excessive mortality rate, thus stamping the epidemic as severe in extent and type. The disease spread into Kavalla the latter part of December, 1917, and soon prevailed in epidemic form in that city; the total number of cases in Kavalla during the winter of 1917-1918 was about 1000 with 126 deaths.

It is very important to note that the mildness of the present typhus epidemic in Oriental Macedonia is probably due to this severe epidemic of 1917-18, as the number of typhus immunes in both Drama and Kavalla must necessarily have been large at the outbreak of the present epidemic *.

Fig. 13.—Typhus Hospital, Drama.

On account of the above findings, and with the advice of Colonel Kanavatsoglou, it was decided to be best for the American Red Cross medical officers to leave Drama and move on to Serres, where conditions had been and were at that time unsatisfactory.

* See Chart No 2, p. 18, for the history of the typhus epidemic at Drama in 1919.

SERRES

Before the Balkan Wars Serres was a prosperous tobacco and sheep center and had a population of 25000. It was sadly devastated by the Bulgarians during the Second Balkan War in 1913 and now has hardly 11000 inhabitants.

Fig. 14.—Refugee Quarantine Camp, Drama.

The typhus campaign in Serres was not being well handled.

Your Medical Director had had abundant opportunity during the last two weeks in March to study the typhus situation in Serres. His investigations and observations brought out the following facts.

1. That the physical typhus equipment in Serres was adequate, in fact better in many respects than that of either Kavalla or Drama, consisting of:

a. An excellent typhus hospital with tents sufficient

to care for 140 patients. To this hospital all typhus patients were sent, refugees, civilians rich and poor, soldiers and officers—a system much more desirable than having three separate hospitals for different classes of people as in Kavalla. One hospital for all classes economizes medical and nursing care as well as all other hospital work and in addition minimizes the danger of spreading infection, which of course is a big item always to be considered.

Fig. 15.—Delousing Plant on Kavalla Road, Drama.

b. A convalescent hospital, well equipped to care for 40 patients.

c. Three detention camps situated at the three entrances to the city, one on the Salonica road, one at the railroad station, and the third on the road leading to the villages east and north of the city. Each detention camp has its own delousing plant. Before being allowed into the city all refugees as well as other suspicious persons were deloused at one or the other of these detention camps and afterwards held there in quarantine for fifteen days.

d. A central delousing plant, a fine old Turkish bath,

well arranged and capable of disinfecting 400 persons with their clothing daily.

2. That the anti-typhus organization in Serres was sadly inefficient, this inefficiency being partly due to the fact that the authority for the management of the campaign did not rest securely in one person; inefficient too because the ostensible head of the organization was not an experienced epidemiologist. It is veritably impossible to manage any epidemic successfully with the above conditions prevailing in the organization.

Consequently the population of Serres suffered unduly from typhus fever and [illegible] ...ore would continue to suffer unduly just so long as their typhus organization remained so fundamentally faulty*.

Our Medical Officers in Serres.

Such were the conditions confronting our medical officers, Captain White and Lieutenant Hodgson, when they arrived in Serres on April 11. Plainly there was much work mapped out for them in their new station. They followed pretty much the same program as already carried out so successfully in Kavalla and Drama — careful inspections of delousing plants and medical inspections of the different city sections, followed by suggestions and recommendations.

Later two city sections were turned over to them, each with a full corps of assistants, and they took over the responsibility for the daily medical inspections of these sections.

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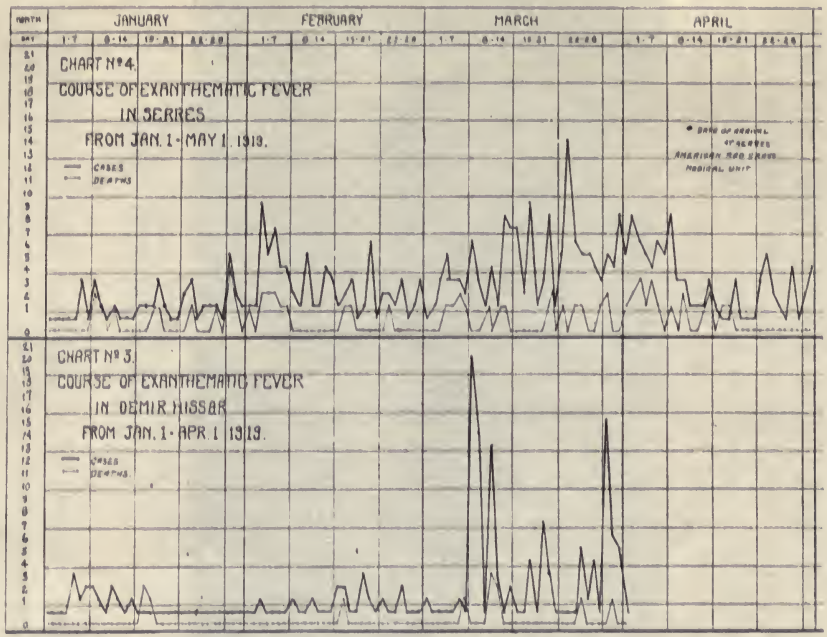
* See Chart No 3, p. 29, showing the course of the typhus fever at Serres. Note the marked increase in cases during March and the first week of April; during this same period of time typhus conditions in both Kavalla and Drama had distinctly improved.



CHARTS No. 3 and No. 4.

Of course this was useful work, but no radical improvement in the Serres typhus work could be expected until the whole typhus organization was overhauled and renovated.

That the people of Serres did not have complete faith in their organization, not even in their American doctor, is shown by the following interesting quotation from Captain White's report. «Yesterday an interesting religious procession chanted its way through my section to scare

Fig. 16.—Typhus Hospital, Serres.

away the pestilence of typhus. Boys bearing holy banners and relics, priests in their robes and crowds of people bearing lighted candles trudged along in broad daylight».

After exasperating delay, the much desired reorganization finally took place. An entirely new typhus organization was formed at a meeting held on April 23rd, attended by the Nomarch, Colonel Kanavatsoglou, doctors, priests and school teachers. At this meeting Lieutenant Kyriazides, an expert epidemiologist, was definitely placed in charge of the Serres campaign by Colonel Kanavatso-

glou, thus replacing the old regime under which things had gone so laxly and badly. Our representations to Colonel Kanavatsoglou had had much to do with bringing about this all-important move.

From now on the situation began to improve; there was however a considerable increase of cases during the first week in May, due, in the opinion of our medical officer, to the careless work done by the officials during

Fig. 17.—Captain White's Inspection Group for Section 1, Serres.

the four Easter holidays, April 18 to 21 inclusive, some of them neglecting their inspections almost entirely.

A good idea of the undiscipline prevailing in the Serres organization may be had by noting that one physician was penalized to two weeks' confinement for failure to report a dying typhus case, and other penalties are pending for two other physicians for failure to report cases.

The latest report from Serres shows the typhus situation in that city to be at last quite satisfactory, and our medical officers confidently feel that by the end of May

at the latest the epidemic of typhus fever in Serres will have been entirely wiped out.

On account of this decided improvement in the typhus situation in Serres there seemed to be no longer need for our cooperation; therefore on May 27th our medical officers ceased work in the city of Serres.

On March 23 your Medical Director accompanied by Lieutenant Kyriazides made a flying visit to Demir Hissar, a picturesque little city of 6000 inhabitants, situated on the Struma River and about 30 kilometers from Serres. We found the same old story — sufficient equipment, but poor, — very poor, — organization, in fact easily the worst anti-typhus organization we had so far seen in Macedonia. In consequence this beautiful little city was also suffering unduly from typhus fever. Up to the time of our visit Demir Hissar had had just 100 cases of the fever with 10 deaths*.

With the work in Serres over, the share of the American Red Cross in the anti-typhus campaign in Oriental Macedodia ended. There is no more typhus fever in Kavalla, no more typhus fever in Drama, only very occasional cases in Serres, and, as we hear, none at all in Demir Hissar.

* See Chart No 4, p. 29, for the course of typhus fever at Demir Hissar. Note the alarming increase of cases during the month of March, during which month decided improvement in the typhus situation in both Kavalla and Drama had taken place. The Demir Hissar authorities claimed that practically all the new cases of typhus fever occurring in Demir Hissar during the first part of March were found among the refugees sent there with clean-bill-of-health certificates from Kavalla.

GENERAL COMMENTS

1. The total number of typhus cases occurring in Oriental Macedonia in the four most important centers of infection for the period from January 1, 1919, to May 1, 1919, which period practically covers the whole life of the epidemic, was 1318 with 168 deaths, making the average mortality rate for the epidemic 12.74 %.

It may be interesting to note the following division of the statistics:

Place	*Total Cases*	*Total Deaths*	*Mortality Rate*
Kavalla	647	86	13.29 %
Drama	222	28	12.60 %
Serres	310	42	13.55 %
Demir Hissar	139	12	8.63 %
	1318	168	12.74 %

Therefore it will be seen that the epidemic of typhus fever in Oriental Macedonia in the winter and spring of 1919 was not severe either in extent or type.

2. The sanitary authorities were notoriously lax and negligent in the measures taken to control the epidemic in its early stages; in some instances their methods really encouraged rather than checked the epidemic. Not until February 25th and after did the authorities adopt anything like proper methods to control the epidemic, and then only in Kavalla; in other places much later; in Serres for instance not until April 23rd was an efficient anti-typhus organization formed.

3. The Greek anti-typhus organizations as finally formed were model and efficient bodies. The Greek medical officers are exceedingly well-trained men and entirely

competent to handle properly important public health problems.

4. The co-operation of the American Red Cross with the Greek authorities in the anti-typhus campaign in Oriental Macedonia was satisfactory from every point of view. The plan of co-operation worked smoothly and well, and can be urgently recommended for similar situations. The part played by the American Red Cross in helping

Fig. 18.— Typhus Commanders for Oriental Macedonia: left to right, Lieutenant Kyriazides, Colonel Kanavatsoglou, Colonel Schultze, and Lieutenant Moutoussis.

to control the epidemic was well worth while: we brought to the Greeks both morale and intrinsic service.

5. We gave the Greeks much advice, a commodity not usually highly appreciated, especially when given often and free; in addition, however, the American Red Cross contributed the following supplies, all directly concerned with the typhus situation: for the Mayer hospital, Kavalla, 330 hospital bed-shirts, 1000 pairs socks, 450 mens' flannel shirts, 400 mens' drawers and 500 mens' undershirts; also

100 typhus blouses for the doctors, nurses and attendants in the Kavalla hospitals and delousing stations. We also furnished all the bread used at the Kalamitza camp, the tent quarantine camp, for the 700 refugees arriving April 8; this distribution began on April 12 and continued until May 30. Two large tents were contributed by us to this camp. In Drama typhus blouses were provided for the doctors, nurses and attendants in the Drama hospitals and delousing stations. All this, taken altogether, was not a large contribution, but it helped.

SPECIAL AND FINAL COMMENT

The entire personnel of the American Red Cross in Oriental Macedonia conducted themselves splendidly during the whole period of the epidemic. Facing an epidemic of a strange disease in a strange land is no laughing matter, yet our personnel to each man, to each woman, showing not the slightest fear, the slightest panic, remained on duty, faithfully performing their unselfish work of carrying relief to the sick and needy, just as if no such thing as typhus fever existed.

Such faithfulness, such fortitude, came high, and unfortunately the price was exacted; one after another five American Red Cross workers in Oriental Macedonia were stricken with typhus fever contracted in the line of duty.

Lieutenant Edward Walker of New York City and Blacksburg, Va., contracted typhus fever in Kavalla and was taken sick in Drama on February 19. He arrived in Athens February 23rd, an extremely sick man, in spite of every care and attention. His condition continued desperate until his death on March 3, 1919.

Lieutenant Kenneth A. Thomas of Bridgeport, Conn., contracted typhus fever in Kavalla and was taken sick in Kavalla February 22nd, had a mild type of the disease, convalesced well and rapidly, and was able to return to light duty the first part of April.

Miss Clarissa A. Blakeslee of Philadelphia, Pa., contracted typhus fever in Kavalla and was taken sick in Drama February 21st, had a severe type of the disease, and convalesced satisfactorily.

Miss Florence A. Stone of Plainfield, N. J., contracted typhus fever in Kavalla, and was taken sick in Serres March 11; she had a severe type of the disease, and is now in Athens completing her convalescence.

Lieutenant J. H. Hodgson of Boston, Mass., contracted typhus fever in Serres and was taken sick in Serres April 26th; he is now in Athens completing his convalescence. Lieutenant Hodgson was a member of the American Red Cross anti-typhus medical unit and undoubtedly contracted the disease as a direct consequence of his daily association with many typhus cases.

PERSONAL

I wish to take this opportunity to thank the following Greek officials and officers for their unvarying courtesy and kindness to me personally and to the organization which I represented, the American Red Cross.

Mr. Gotsis, Governor General of Oriental Macedonia; General Negroponte, ranking army officer of the Kavalla District at the time of my arrival in Kavalla; Colonel Kanavatsoglou, Surgeon-General of the Greek Army and General Commander of the typhus work in all Macedonia; Colonel Kourtakis, Chief Medical Officer of the

13th Division, Greek Army; Major Syrichas, Commander of the typhus organization in Serres; Lieutenant Moutoussis, epidemiologist and Commander of the Greek typhus organization in Kavalla; and Lieutenant Kyriazides, epidemiologist and Commander of the typhus organization in Drama and Serres.

Our relations with Colonel Kanavatsoglou, Lieutenant Moutoussis, Lieutenant Kyriazides and Major Syrichas were unusually intimate and personal, and I feel that any success that attended the efforts of the American Red Cross medical unit in Oriental Macedonia was largely due to the splendid personal feeling that existed between these four men and ourselves. We appreciated them and they appreciated us; they deserved it from us, and we deserved it from them. This sort of mutual-admiration society helped tremendously; it made our work easier, pleasanter, more worth while and undoubtedly more efficient.

For the members of our own medical unit, Captain White and Lieutenants Binger, Hodgson and Clark, I have only praise; they did their work in Macedonia faithfully and well. Such a group of men would make any organization a going concern and I wish to thank them for their loyalty and cooperation throughout the campaign.

Also I wish to thank Mr. Hill, Director of the American School at Athens, for his invaluable services as secretary, interpreter, diplomat and adviser to the medical unit.

Finally I wish to thank the trained nurses Miss Hartz, Miss Martin and Miss Addison for their splendid, self-sacrificing and skillful nursing of our personnel sick with typhus. I saw a great deal of their work and I know they deserve all the praise being heaped upon them.

FINALE

The typhus epidemic in Oriental Macedonia is over, and it will always be a pleasure to be able to look back and say that the American Red Cross helped to «put it over» and helped to check the Typhus Fever Epidemic in Oriental Macedonia in the winter and spring of 1919.

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